(No Model.) 3 Sheets—Sheet 1.

E. G. BATES.

CONSECUTIVE NUMBERING MACHINE.

No. 484,389. Patented Oct. 18, 1892.

FIG 1.

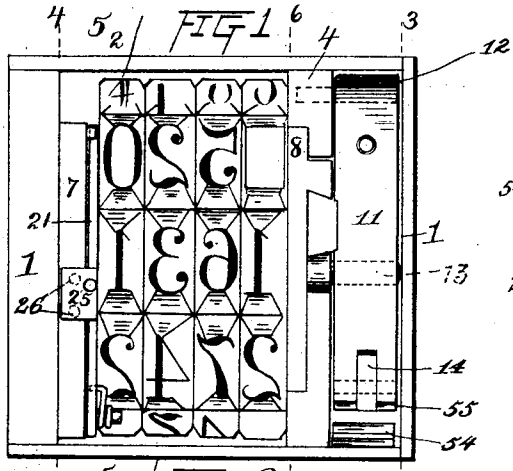


FIG. 3.

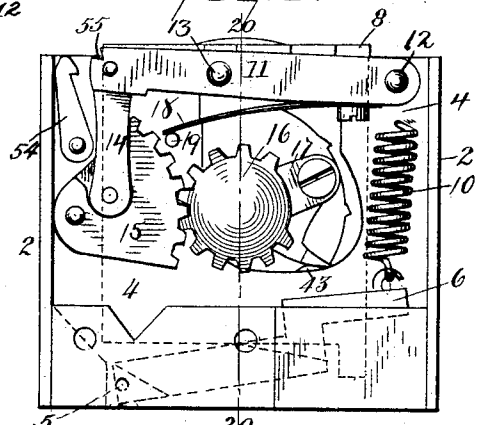


FIG 2.

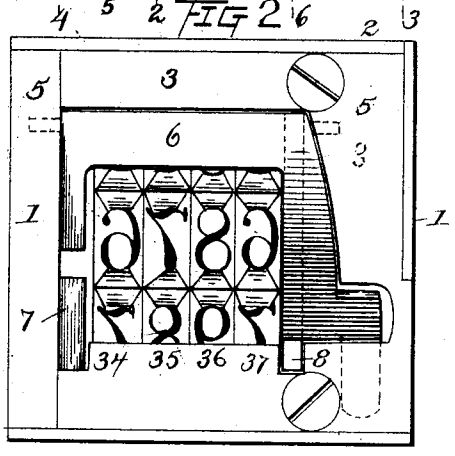


FIG 4.

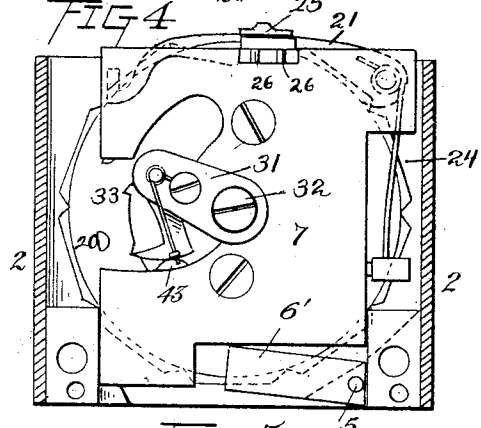


FIG 5.

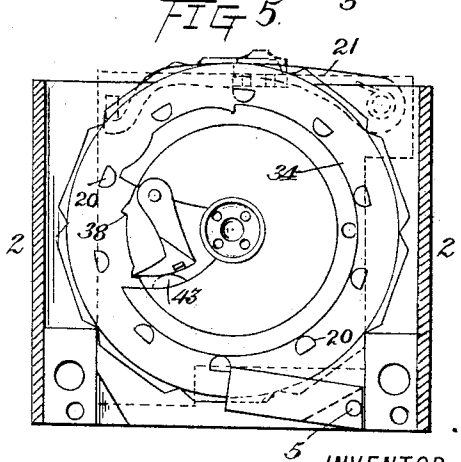
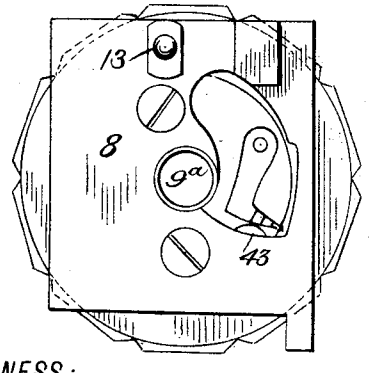


FIG 6



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(No Model.) 3 Sheets—Sheet 2.

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CONSECUTIVE NUMBERING MACHINE.

No. 484,389. Patented Oct. 18, 1892.

FIG. 8.

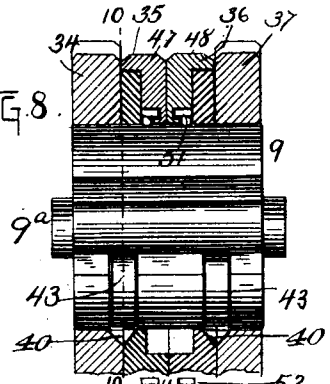


FIG. 9.

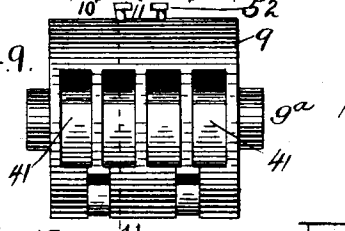


FIG. 11.

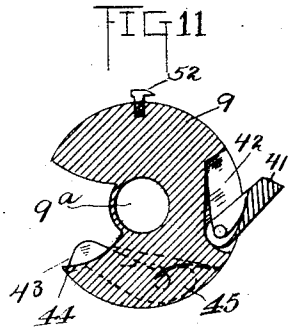


FIG. 10.

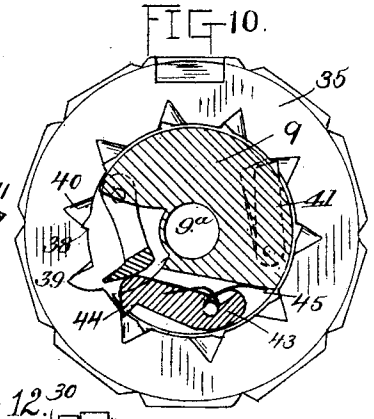


FIG. 12.

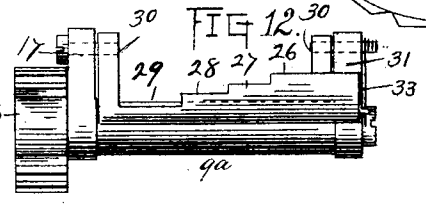


FIG. 13.

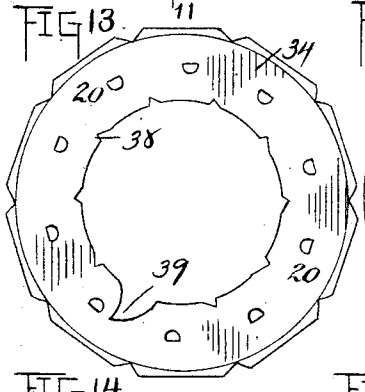


FIG. 16.

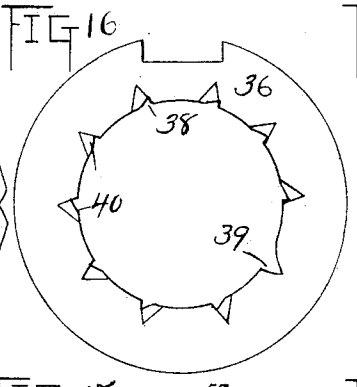


FIG. 18.

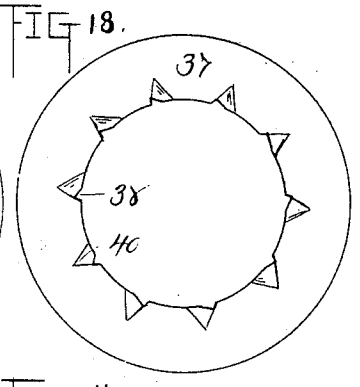


FIG. 14.

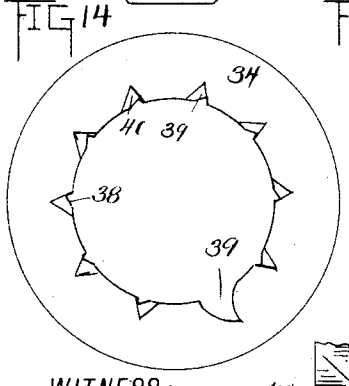


FIG. 15.

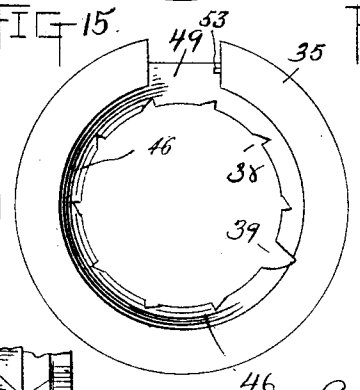


FIG. 17.

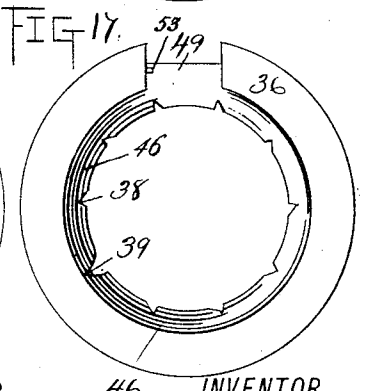
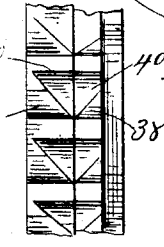


FIG. 19.



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(No Model.) 3 Sheets—Sheet 3.

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CONSECUTIVE NUMBERING MACHINE.

No. 484,389. Patented Oct. 18, 1892.

Fig. 20.

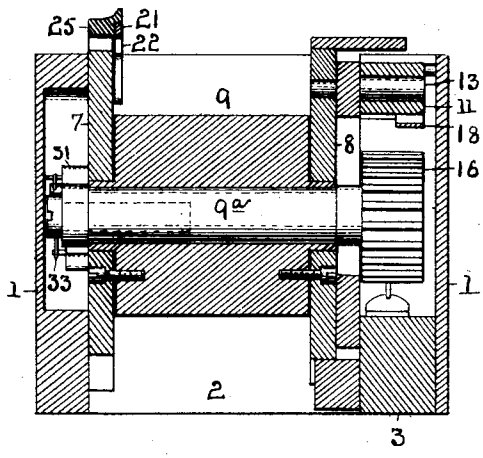


Fig. 7.

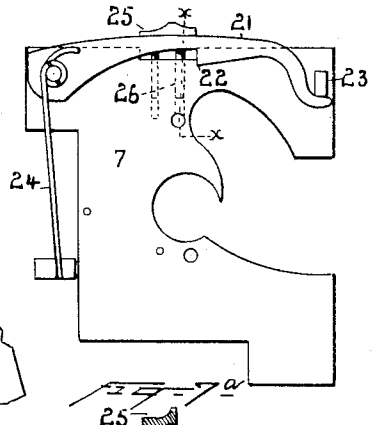


Fig. 21.

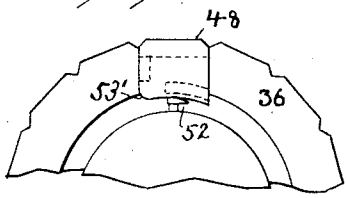


Fig. 22.

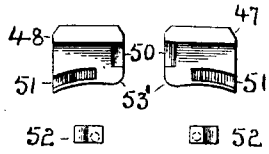
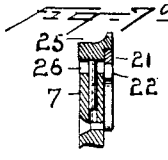


Fig. 7a.



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N. F. Oberly

Inventor
E. G. Bates
By his Attorneys
Dyer & Seely.

UNITED STATES PATENT OFFICE.

EDWIN G. BATES, OF NEW YORK, N. Y., ASSIGNOR TO THE BATES MANUFACTURING COMPANY, OF NEW YORK.

CONSECUTIVE-NUMBERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 484,389, dated October 18, 1892.

Application filed April 25, 1890. Serial No. 349,452. (No model.)

To all whom it may concern:

Be it known that I, EDWIN G. BATES, a citizen of the United States, residing at New York city, in the county and State of New York, have invented a new and useful Improvement in Consecutive-Numbering Machines, of which the following is a specification.

My invention relates to machines for printing consecutive numbers, designed particularly to be set up with type in a printer's form and to advance the number printed by it at each impression; and my object is generally to increase the effectiveness, simplicity, and compactness of machines of this general character.

More particularly my objects are to simplify and increase the efficiency of the mechanism employed to rotate the type-wheels, to effect the locking of the type-wheels from movement for a short space of time after the impression has been made, so that the impression will not be blurred, and to provide mechanism whereby the turning of the printing-wheels is controlled, so that they will not be brought by the turning movement beyond their proper printing position.

In carrying out my invention I employ a hub upon which the type-wheels are supported, said hub and type-wheels having a reciprocating motion communicated to them by the platen of the printing-press, and said reciprocating motion being multiplied and converted into a turning movement which effects the rotation of the numbering-wheels. The numbering-wheels are notched on their inner peripheries with ten notches, as is usual, each numbering-wheel except the last one of the series having one notch deeper than its remaining notches and of less depth than the deep notch of its adjacent lower printing-wheel. Teeth or pawls are adapted to work in said notches, the said teeth or pawls decreasing in length in the same direction as do the deep notches on the type-wheels—that is to say, the notches on the units-wheel and the longest tooth or pawl operate together. These teeth or pawls are preferably cut or formed from the same piece and are moved together within a recess in the hub, so that when the tooth opposite a wheel is in the deep notch thereof the tooth or pawl for the next higher wheel will be in position to enter one of its notches and move it the space of one printing character. This pawl is oscillated, preferably, through a segmental gear engaging with a rack that receives motion through a system of levers operated by the downward movement of the printing-wheels. The operation of the levers communicates to said rack an increased movement on its toothed face, so that considerable turning movement is communicated to the segmental gear and consequently to the shaft controlling the pawls. The units type-wheel is provided on one of its sides with ten pins or projections, one for each printing character. Pivoted in position so that the movement of the platen will force one end of it downward is a lever upon which is mounted a printing-period, which has a shouldered portion on it, which portion when it is forced downward is adapted to come in front of one of said pins and thereby prevent the turning of the units type-wheel and consequently of the other type-wheels, and therefore preventing all the wheels from rising until the pin becomes disengaged, thereby releasing said units-wheel and consequently permitting it to turn and, with the other wheels, rise. This shouldered lever is so arranged that it is pressed by the platen of the printing-machine before the types are, and therefore before the impression is made the type-wheels are locked in the printing position. When the platen leaves the types, this lever is the first to rise, and as its shoulder is of some length the type-wheels are held in the printing position until the platen has cleared them. At this point the pin in engagement with the shoulder of the lever becomes disengaged, and thereupon said units-wheel is permitted to move and, with the other wheels, rise. By this arrangement the blurring of the impression is prevented.

The type-wheels and hub are secured to end pieces which rest upon a pivoted bridge between a portion of which and the stationary portion of the frame a spring is arranged. When the platen forces the type-wheels downward, this bridge is also forced downward and the spring distended. When the platen has left the type-wheels, this spring tends to re-

turn the bridge to its normal position, returning the type-wheels to their highest position at the same time. While the type-wheels are being brought to their highest position, the lever before mentioned as connected to the rack acts to turn the rack in the opposite direction and thereby bring the pawls into position to engage with another notch, the lever which is depressed by the platen having its fulcrum on a stationary part of the machine and being connected with the moving part of the machine to effect this movement. This lever has a notch cut on it, with which a pivoted hook on a stationary part of the frame is adapted to be engaged when the lever is in its lowest position. This permits of the turning in one direction of any of the type-wheels, so that the setting of the machine may be effected. I also employ two sets of detents, one set adapted to engage with notches on the printing-wheels to prevent backward movement of the type-wheels and another set engaging with other notches, but to prevent movement of the type-wheels in the opposite direction. I also employ a drop-cipher or adjustable type-section to secure the general efficiency of my machine.

Other features of my invention will appear in the subjoined description, and be pointed out in the claims.

In the accompanying drawings, forming a part of this specification, Figure 1 is a top plan view of my improved consecutive-numbering machine. Fig. 2 is a bottom plan view thereof. Fig. 3 is a side elevation, looking from the right of Fig. 1, with the parts to the right of the line 3 3 removed. Fig. 4 is a similar view, looking to the left of Fig. 1, with the parts to the left of the plane of the line 4 4 removed. Fig. 5 is a similar view, looking from the left of Fig. 1, with the parts on the plane of the line 5 5 removed. Fig. 6 is a similar view of certain of the parts, taken looking from the right of Fig. 1, with the parts to the left of the plane taken on the line 6 6 removed. Fig. 7 is an elevation of the units locking-lever. Fig. 7^a is a cross-section of Fig. 7 on the line x x. Fig. 8 is a plan view looking down on the recess of the hub, the hub being in elevation and the type-wheels in section. Fig. 9 is a plan view looking at the hub on the opposite side to the recess, the parts being in elevation. Fig. 10 is an elevation of one of the type-wheels, the hub and certain other parts being in section, the view being taken on the line 10 10 of Fig. 8. Fig. 11 is a section taken on the plane of the line 11 11 of Fig. 9. Fig. 12 is a plan view of the oscillating pawls and certain connections. Fig. 13 is an elevation of the units printing-wheel, looking from the left of Fig. 1. Fig. 14 is a view of the other side of the said units-wheel. Fig. 15 is an elevation of the tens-wheel, taken from the right of Fig. 1. In Fig. 10 the other side of this tens-wheel is shown. Fig. 16 is an elevation of the hundreds-wheel, taken looking from the right of Fig. 1. Fig. 17 is an elevation of the opposite side of said hundreds-wheel. Fig. 18 is an elevation of the thousands printing-wheel. The opposite side of the thousands-wheel is like Fig. 13, except it has no pins or deep notch. Fig. 19 is a detail showing the relationship which exists between certain of the notches of the units and tens wheels and also between the hundreds and thousands wheels. Fig. 20 is a cross-section on the line 20 20 of Fig. 3, the type-wheels being omitted. Fig. 21 is a side view of a portion of a type-wheel 36, looking from the left of Fig. 8. Fig. 22 is a view showing in elevation the two cipher-sections and top views of the hooks which engage therewith.

The operating mechanism is inclosed in a suitable box or case comprising end plates 1 1, side plates 2 2, bottom plate 3, and partition 4. In one of the said plates 1 and the partition 4 is pivoted at 5 5 a bridge 6. Resting upon this bridge are the side plates 7 8, which carry the hub 9, which supports the type-wheels, which are located upon the hub between said plates. This hub, as will be seen in Figs. 10 and 11, is recessed in such manner that at no part is the material thereof altogether cut away. This method of forming the hub insures that there will be no tendency to bind by the separation of the sides of the hub, as would occur if the hub were cut all the way through. To the free end of the bridge 6 one end of the spring 10 is attached, the other end of the spring being connected to plate 4 or other fixed part of the frame. The end 6′ of the bridge bears against the bottom edge of plate 7. The side plates 7 8 have a reciprocating motion, the inward movement being communicated to them by the platen striking the type-wheels and forcing them down, and the upward movement being communicated by means of the bridge 6, which rests against said plates, said bridge being drawn to its highest position when the platen is removed by the spring 10.

The inward movement of the type-wheels and plates 7 8 is a slight movement. This movement is utilized to effect the oscillation of the operating-pawls. In order to give the pawls the required extent of oscillation, I employ mechanism for multiplying this movement, of which the following is a description: A lever 11, fulcrumed at 12 on the partition 4, is connected by the pin 13 with the plate 8, so that the inward motion of the said plate will be communicated to the lever. To the free end of said lever is pivoted another lever 14, the other end of which is pivoted to the segmental rack 15, the inner end of which is pivoted to the partition 4, as shown in Fig. 3. This rack engages with a pinion or toothed segment 16, rigidly secured to shaft 9^a, (shown in Fig. 12,) which shaft carries arms 17, Fig. 3, and 31, Fig. 4, rigidly secured thereto, in which the oscillating pawls are hung. A spring 18, secured to the under side of the lever 11, has its free end resting on the pin 19, projecting from the partition 4, so that the

tendency of said spring is to force the lever 11 outward. In operation the platen forces the type-wheels downward with the said plate 8, carrying the lever 11, thereby forcing the rack 15 downward and moving the pinion 16, so as to carry the arms 17 and 31 around and thus oscillate the pawls. When the platen is removed, spring 18 acts in conjunction with the spring 10 to throw the lever upward and the rack and pinion are returned in the opposite direction, thus turning the arms 17 and 31, with the pawls, to their first position. By this operation the simple downward movement given to the type-wheels is converted into a multiplied movement for the pawls, and the type-wheels are rotated by the pawls the required distance, the downward movement of the type-wheels bringing the pawls into position to engage a new notch in the type-wheels and the upward movement of the type-wheels forcing the pawls to revolve the type-wheel or type-wheels the space of one printing character to the position shown in Fig. 3.

The units-wheel is provided with ten projections 20, one for each printing character, projecting at right angles from the side thereof nearest the plate 7. Pivoted on the face of the plate 7, opposite pins 20, is a lever 21, which is shouldered at 22, as shown in Fig. 7, and provided with a stop 23, projecting from said plate 7, and a spring 24, the tendency of which is to maintain said lever in the position shown in said figure. A section 25, carrying the period or dot, is mounted on the plate 7, so as to have an in-and-out movement in relation thereto, suitable provision being made to prevent said section from dropping out. Pins 26, projecting from the under side of said section, enter suitable holes in the top of said plate 7 and serve to guide said section. A flange of said section projects over the top of lever 21. In operation the platen, striking the dot or period on section 25, which is in an advanced position with relation to the type-wheels and remainder of the machine, forces said section inward, and thereby carries with it the lever 21, the shoulder of which is brought opposite one of the pins 20 on the units-wheel, thereby locking said wheel and consequently the wheels behind it from further movement in one direction. As the platen leaves the numbering-machine the spring 24 will force the lever 21 and section 25 outward after it and the type-wheels will be locked from movement until the shoulder at 22 is altogether out of the way of the pins 20 of the units-wheel. By this arrangement the blurring of the impression is avoided, as the type-wheels are held stationary for a certain space of time before the impression is taken, while the impression is being taken, and after the impression has been taken.

The oscillating pawl is provided with a tooth for each printing-wheel, the largest tooth 26 being inside the units-wheel, the next in depth 27 being inside the tens-wheel, the next 28 inside the hundreds-wheel, and the smallest tooth 29 being inside the thousands-wheel. These teeth are preferably formed from the same piece of metal and are provided with side arms 30 30, one of which is pivoted in the arm 17, which is rigidly secured to and carried by the shaft 9^a, and the other of which is pivoted in an arm 31, also rigidly secured to the other end of said shaft. The spring 33 is arranged, as shown, between the arm 31 and the pawls and the pawl-carrier, the tendency of which is to throw the pawls always outward.

34 is the units-wheel, the opposite sides of which are shown in Figs. 13 and 14. 35 is the tens-wheel, the opposite sides of which are shown in Figs. 10 and 15. 36 is the hundreds-wheel, the opposite sides of which are shown in Figs. 16 and 17. 37 is the thousands-wheel. Each of these wheels, except the thousands-wheel, is provided with nine shallow notches 38 and one deep notch 39. The thousands-wheel has ten uniform notches 38. These notches are the ones with which the pawls engage for the purpose of effecting the rotation of the type-wheels in consecutive order.

In addition to the notches 38 and 39, ten other notches 40 are provided on one side of each type-wheel. As shown in Fig. 19, the notches 40 and 38 descend in opposite directions. These notches 40 are provided in the type-wheels for the purpose of locking them in the positions into which they are moved by the pawl, so that they will not be carried by the momentum which they attain farther than their proper positions. To prevent a backward throw of the type-wheels, I provide for each wheel a detent 41, pivoted in the recesses in the hub 9, as shown at Fig. 11, each of said detents being provided with a spring 42, a recess being formed in the under side of said detent to receive said spring, and the tendency of which spring is to throw the detent outward, as shown in said figure. It will be seen that by providing one of these detents for each wheel the movement of that wheel is permitted in the increasing direction; but its movement in a backward direction is prevented. Pivoted in other recesses in the hub 9 are detents 43, each of which carries a tooth 44. A hair-spring 45, arranged as shown in Figs. 10 and 11, tends to throw said detent inward, as shown in Fig. 11. One of these detents is provided between the units and tens wheels and another between the hundreds and thousands wheels. Their outward movement to lock the two wheels between which they are located is effected by the downward movement of the pawls, which, coming in contact with the free ends of said detents, as shown in Fig. 10, forces them outward into the notches 40 on the type-wheels, two of which notches will be in the position shown in Fig. 19, so that the tooth on the detent can enter the notches on the two adjacent wheels and lock both wheels for the time from further forward movement. The opposing faces of the wheels in connec-

tion with which the detents 43 operate are cut away, as shown at 46 in Figs. 15 and 17. It will be seen from this description that when the platen of the machine is away from the type-wheels the detents 41 and 44 are both in position, so that no movement of the type-wheels can take place, both of said detents being in engagement with the notches 40. Therefore the type-wheels are held from any tendency to rotate while the platen is away from them, the pins 20 and lever 21 holding the wheels from turning while the impression is being taken.

The loose cipher-sections 47 and 48, with which the tens and hundreds wheels are provided, are L-shaped in cross-section, the said wheels being cut away to about half their thickness to receive said sections, as shown at 49, Figs. 15 and 17. The horizontal arm of the L-shaped sections carries the printing character and the vertical arm is recessed at one side at 50. A pin 53, Figs. 15 and 17, projecting from the mortise in the type-wheels, enters this recess 50 and prevents the cipher-section from dropping out altogether. The vertical arm of the cipher-section is also provided with the longitudinal recess 51. On the hub 9, Fig. 11, are carried wipers 52, one for each type-section. In operation as the type-wheels bearing this loose section are turned the rounded corner 53′ of the drop-section will be brought in contact with the beveled edge of the wiper and forced outward to the printing position. When it is desired to set the machine, however, to begin printing at "1," the type-wheels are first pressed to their extreme inward position, in which position they are locked by pressing the hook 54 into the notch 55 in lever 11, Fig. 3. Then the type-wheels bearing the drop-sections are turned until they are forced outward by the wiper 52. They are then turned until the drop-sections is beyond a wiper 52, whereupon the drop-sections can be forced into their lowermost positions, and by turning back the type-wheel a flange or projection of the wiper will enter the recess 51 and hold the same below the printing-surface or out of printing position.

Having thus described my invention, what I claim is—

1. In a consecutive-numbering machine, the combination, with the reciprocating printing-wheels, of a system of levers moved inward by the inward movement of the type-wheels and gearing between said levers and printing-wheels for converting the inward movement of said levers into a turning movement of the said wheels, substantially as set forth.

2. In a consecutive-numbering machine, the combination for rotating the printing-wheels, of a lever pivoted on a part stationary relatively to the printing-wheels, a connection between said lever and a part movable with the printing-wheels, a pivoted rack, a connection between said rack and pivoted lever made at a distance from the pivot of the rack, and gearing between said rack and the operating-pawls, substantially as set forth.

3. The combination, with a series of printing-wheels notched on their inner peripheries, of a hub, detents pivoted to said hub, a spring acting to force said detents out of said notches, and operating-pawls adapted to force said detents in the opposite direction, substantially as set forth.

4. The combination, in a consecutive-numbering machine, of a series of operating-pawls, two sets of detents, one set adapted to prevent movement of the printing-wheels in the increasing direction and the other set adapted to prevent movement in a backward direction, and said printing-wheels provided on their inner peripheries with a set of notches adapted to coact with the pawls and one set of detents and provided on one face with notches for the other set of detents, substantially as set forth.

5. In a consecutive-numbering machine, the combination, with a series of printing-wheels and pawls therefor, of a lock for said wheels, comprising a pivoted shouldered lever, a spring acting thereon and normally holding the same above the periphery of the printing-wheels, and projections on one of said wheels normally out of engagement with said lever, but in position to be engaged thereby, whereby in printing the locking-lever is first moved to lock the wheels, printing is then effected, and the lock is raised by its spring to release the printing-wheels, substantially as described.

6. In a consecutive-numbering machine, the combination, with a series of printing-wheels and pawls therefor, of a locking device for said wheels to lock said wheels from turning before, after, and while the impression is being taken and comprising a detent and co-operating pins or devices carried by one of the wheels, and a projecting printing-section carried by the framework and overlapping said detent, whereby when the projecting printing-section is pressed in by a printing-platen the detent will be moved, substantially as set forth.

7. In a consecutive-numbering machine, the combination, with a series of printing-wheels and pawls therefor, of a printing-section independently mounted with respect to said wheels and movable in and out in a straight line, a pivoted shouldered lever adapted to be operated by the movement of said printing-section, and pins on one of said printing-wheels, substantially as set forth.

8. In a consecutive-numbering machine, the combination, with the type-wheels and supporting-hub therefor and pawls for advancing the type-wheels, of a pivoted bridge, plates between the bridge and hub, and a spring connected to the bridge for moving it in one direction, substantially as set forth.

9. In a consecutive-numbering machine, the combination, with a box or casing, of a bridge

pivoted therein, printing-wheels movable in a direction to depress said bridge, means for advancing the wheels, said wheels having an axis supported in suitable pieces resting on the bridge, and a spring to return the bridge to its normal position, substantially as set forth.

This specification signed and witnessed this 22d day of April, 1890.

EDWIN G. BATES.

Witnesses:
D. H. DRISCOLL,
W. PELZER.